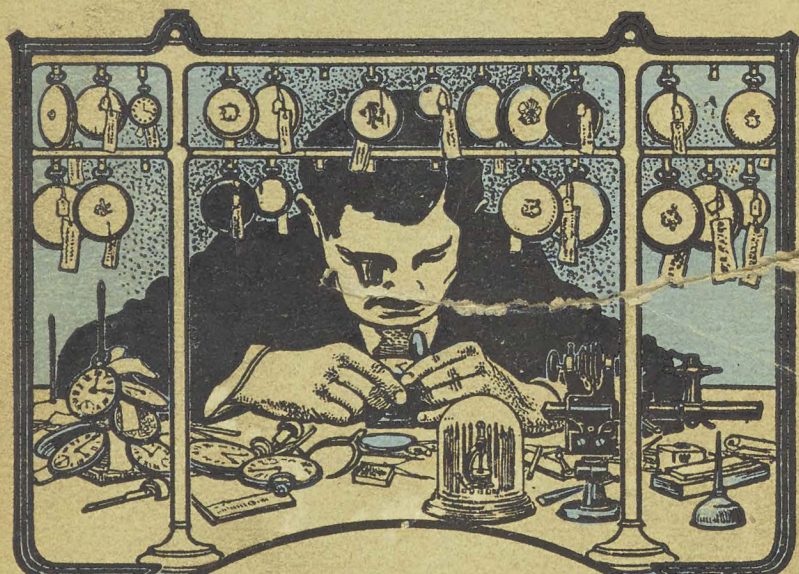


Become an Expert WATCH MAKER

AND EARN

\$25⁰⁰ to \$65⁰⁰ Per Week



LESSON NO. 4

Rogers, Thurman & Co.

(INCORPORATED)

Jewelers Wholesale
Supply House

CHICAGO, U.S.A.





LESSON NO. 4

Paragraph No. 1

Now is the Time to Start Your Business.

☐ You will now learn how to handle a repair job and to estimate the cost for doing the work. It is important that you give the following paragraphs careful attention, because when you have learned this lesson you can open your repair shop and commence doing business, as you will have learned how to receive work from your customers and can tell them how much the jobs will cost. Any work you cannot handle will be done by us. We will give your orders prompt attention, so that you can give your customers quick service, and will give you the benefit of the special 10 per cent discount from our regular wholesale watch repair price list, as explained in Lesson No. 1. Detailed instructions for making all of the repairs will not be given in this lesson, as some of them require special chart illustrations and explanatory paragraphs. If you have purchased the tool outfits called for in Lessons Nos. 1, 2 and 3, or the Champion \$15.00 outfit, it is time for you to make your start, and there is no reason, if you are adapted to the trade and will make an honest effort, why you should not build up a very successful business. Your development will be carefully watched by the Superintendent of our Instruction Department, Mr. Chas. F. Elmore, whose province it is to see that you learn the watchmaker's trade and become so proficient that there can be no doubt regarding your ultimate success.

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Paragraph No. 2

Examination of Balance Wheel and Mainspring Test

¶ If possible, when you take in a watch repair job, have your customer leave it so that you can examine it at your leisure. If he wants an estimate of the charges immediately, you should proceed as follows: Wind the watch to determine if the mainspring is broken. If the spring is broken there will be no resistance to the winding crown and you can keep winding indefinitely. If the spring is broken, you have probably located the trouble; but must continue the examination. Test the balance wheel to see if the balance staff pivots are broken. Use your eye-glass and tweezer when doing this. If the pivots are broken, the wheels will be loose in their sockets and will have too much end shake and side shake. Also examine the balance wheel and see if it rubs on the movement plate and is not perfectly true. If you find any of these defects, make a memorandum of them for future reference in estimating the charges.

Paragraph No. 3

Examining Hairspring, Plate Jewels and Roller Jewel Test

¶ Now examine the hairspring. It must be exactly parallel with the balance wheel. See if the coils are all free from each other—do not rub on the wheel or balance bridge and are not rusty. See if the outer coil of the spring is in position between regulator pins. Examine the plate jewels carefully with your eye-glass. If they need cleaning, the oil will show on the surface of the jewel and will be discolored. The jewels and pivot holes must have a bright clean appearance or the movement

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needs cleaning. Turn the watch over and start the balance wheel. If the second hand does not revolve when the balance wheel is working, you will know that the roller jewel is broken.

Paragraph No. 4

Examining the Hour, Minute and Second Hands

☞ Test the end shake of the hour hand with your tweezer. Revolve the hand and try it in several different places. See if the second hand rubs against the dial. The pipe of the second hand should be in the center of the hole or the friction caused by its rubbing against the dial will keep the movement from running. Before going further, you must know that in the majority of cases the repairs on a watch are very simple and it is not necessary to impart this information to your customers. You have learned by careful study and there is no reason why you should give your stock in trade for nothing. If you locate the trouble in the hands and think a further examination is necessary you can remove the movement from the case and examine the inside of the movement with your eye-glass this will enable you to see if any of the other parts are broken without taking the movement apart, and you can tell your customer what the charges will be. The work outlined in these four paragraphs will only require a few minutes' time and is very easy. The following paragraphs tell how to continue the examination of the watch movement and pertain to watches you are going to repair.

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Paragraph No. 5

Examination of Balance Jewels, Balance Staff, Hour and Minute Wheels and Canon Pinion

¶ After you have examined the movement, as described in the foregoing paragraphs, remove it from the case and lay it on your bench face down, remove the balance bridge, examine the balance jewel with your eye glass to see if it is broken, then examine the pivots of the balance staff with your eye glass. Notice their condition. If they are broken, it will be necessary to put a new staff in the wheel or they may need polishing. Directions for doing this work will be given in the lessons that follow. Place these parts in a movement tray and turn the movement over, dial side up, and remove the hands and dial as described in Lesson No. 1. Examine the hour wheel and minute wheels. See if teeth are in good condition. You now see if the canon pinion is in good condition and is not too loose on the center staff where it is held by friction. Remove it and proceed as described in paragraph No. 6.

Paragraph No. 6

Testing End and Side Shake

¶ Let down the mainspring as described in Lesson No. 1, Paragraphs 6 and 7. Then test the end shake of the center staff. See if it has sufficient play and does not bind. Also test the end shake of the third and fourth pinions and the pallet arbor. All of these pinions must have sufficient end shake as described in Lesson No. 2. Use your eye-glass when doing this work and try the different pinions with the tweezers. If you locate any

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trouble, make a memorandum for future reference. Instructions for the proper adjustment of end and side shake will be given in the lessons that follow.

Paragraph No. 7

Examination of Mainspring and Barrel

☐ Remove the mainspring barrel, examine the teeth very carefully, then remove the barrel head and see if the mainspring needs oil and if any of the coils are stuck together. Then remove the mainspring and examine the coils to see if they are rusty. Also notice if the spring is set. A spring that is set will not have much elasticity. When removed from the barrel it will not spring open as far as one that is in good condition, and should be replaced with a new one. Now replace the barrel arbor without the mainspring, put on the barrel head and test the end and side shake of the barrel arbor. See if it has enough play in the bearings to work without friction.

Paragraph No. 8

Examine Pallet Stones, Teeth of Wheels and Winding Parts

☐ You now remove the pillar plate and examine the pallet stones. Hold the pallet in your tweezers and examine the stones with your eye-glass to see if they are chipped or loose in the pallet. Then examine the teeth of the wheels, also the pinions; if they are rusty it is necessary to clean them. Remove these wheels, turn the pillar plate over and examine the winding parts. Note any defects that you find and then proceed with the repairing.

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Paragraph No. 9

Special Information

¶ The following lessons will tell how to repair all of the parts mentioned in this lesson on which you have not already received instructions in the first three lessons. The work hereafter will be more interesting. You have practically learned how to repair a watch, but need more instruction pertaining to the escapement of a watch movement, and instructions telling how to use a lathe, also more information regarding your staking tool, jewelry tool, etc. In the meantime you can conduct your repair business and send us the work you cannot handle to advantage. We will do it for you at special cost prices as shown on Student's Special Price List.

¶ Do not delay, now is the time to establish your business. You will build up a nice repair trade and will have a line of customers who will give you their trade when you open your jewelry store. We expect to be repaid for teaching you the watch-maker's trade FREE OF CHARGE, by securing you as a customer, and feel that if we give you your start in life you will favor us when it is possible to do so. As our benefit is derived from your future success, we are going to watch your progress step by step. We advise you to commence now, because we know the time is ripe and you can not afford to neglect or overlook your opportunities.

Burnisher

¶ The surface to be burnished must be free from scratches, which the burnisher would not remove, but render it more distinct by contrast, and the burnisher must be kept highly polished, for the surface burnished

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can never be smoother than the burnisher. Burnishing polished pivots with the glossing burnisher preserves them from wearing. Very little, if any, of the metal is removed by burnishing in the ordinary way, although watchmakers sometimes use what are called cutting burnishers to form pivots. The cross sections of these burnishers matches the outline of the pivot it is desired to form, and they are roughened by rubbing on a lead block charged with coarse emery. The pivot is finished with a smooth burnisher of the same form as the cutting are. Silversmiths use burnishers of agate.

To Clean Tarnished Brass

☐ Dissolve cyanide of potassium in water, and give the article an instantaneous dip; wash with clean water, and then with alcohol. If the article remains in the bath too long, the highly polished surface becomes deadened and loses its gloss. Chronometer balances are thus instantly cleaned. They may be dipped in the bath just as they are, without removing the balance spring, and if carefully washed and dried off by alcohol, no danger need be apprehended. The plates and wheels of French clocks and musical boxes are quickly done in the same way, in fact, any tarnished brass work.

Cleaning Silverware

☐ Professor Davenport reports in the Pharmacist that hyposulphate of soda is the simplest and most effective cleansing material for silverware. It operates quickly, is cheap, and has not yet been proposed for the purpose. A rag or a brush moistened with the saturated solution of the salt cleanses, without the use of cleaning powder, strongly oxidized silver surfaces within a few seconds.

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Cleaning Gold Tarnished in Soldering

☐ It is usually cleaned in dilute sulphuric acid. The pickle is made in about the proportion of about one ounce of acid to one ounce of rainwater.

Chamois Skin—How to Clean Them

☐ Chamois skin can be cleaned by washing in warm water with old dry castile soap; and do not be too particular about rinsing all the soap out, as a little left in tends to make the skin soft and pliable.

Cutting Screw Threads

☐ It is quite a knack to make a nice screw, and beginners are generally apt to use too much force when cutting the thread. If the spindle has been turned too large for the hole in the screw plate there is danger of breaking the screw plate, which is very hard, and pieces will chip off; again, the piece to be tapped is apt to break and stop up the hole in the plate, thereby entailing the tedious job of drilling the piece out and cleaning the thread. It is better to begin with a hole much too large and working down gradually. It is natural that a certain amount of force must be employed, and a little practice will soon teach the beginner how much to insure a full good thread. Now, put the screw back in the lathe, and turn the head a little more than the required thickness, and cut the screw off by turning a groove above.

To Prevent Screws from Rusting

☐ If a screw is dipped in a mixture of graphite and oil before being screwed into place, it will be found that it will never rust, so that it can be removed with ease at any time.

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Revamping a Marble Case

☐ A little shine on an old thing sometimes helps amazingly. The repairer is occasionally called on to expend his ingenuity on a marble clock case, and he can give it a handsome polish in the following manner: Take ordinary yellow beeswax, and dissolve it with turpentine into a paste; then take a fine and very soft rag, place in the middle a round lump of wadding, fold the rag over it and tie it together right above the wadding. Upon this take a little of the wax paste, and polish with it. Finally rub the case down with a soft chamois.

To Recover Gold on Plated Articles

☐ The gold-plating on old and worn-out articles can be saved by dipping them in a solution of nitro muriatic acid mixed with three parts chloric acid and two parts nitric acid heated to 86°. The article should be left in this liquid until every trace of gold has disappeared and then the liquid should be boiled down to a syrup and filtered and some green vitriol added. The gold will be found in the form of brown powder, which must be washed with diluted nitric acid, then with water and finally melted with a little borax and saltpeter, when it will come out pure gold.

Repairing Rubber Articles

☐ The following is a very good way to repair vulcanite or rubber watch chains: If an attempt is made to open them cold, the links will, in nine cases out of ten, snap, especially stout ones; and if they do not break, the ends spring open and will not again close. Heating by fire or candle will burn them, but if held over the chimney of a kerosene lamp they will in a few seconds become so soft

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that you might bend them straight and shut them up again or close them as when new without injury to shape or polish. Horn or tortoise shell may be heated in like manner.

A Recipe for Taking the Tarnish Off Silverware

☐ A solution of one ounce of cyanide of potassium to a half gallon of water is about the best. Some parties recommend hyposulphite of soda dissolved in water. The cyanide solution will be found the most satisfactory.

To Cut Glass Without a Diamond

☐ Scratch the glass about the shape you desire with the corner of a file or graver; then having bent a piece of wire in the same shape, heat it red-hot and lay it upon the scratch, sink the glass into cold water just deep enough for the water to come almost on a level with its upper surface. It will rarely ever fail to break perfectly true.

For Cleaning Files

☐ For cleaning a greasy finishing file there is nothing better than a burning over a forge fire, in the flame of an alcohol lamp, or a gas blaze. The burning should be done by a gentle passage to and fro through the flame, until the grease on the file burns with a blaze. Then the blaze should be blown out and the file be carded. When cleaned, dip the file into a jar of lye, and clean in pure water.

To File a Square Hole

☐ When filing a square hole it is necessary to reverse the work very often. A square file should first be used, and the hole be finished with a diamond shaped or half

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round file. This leaves the corners square, as they should properly be.

To Retain the Color in Hard Soldering

☞ Paint the article with a solution of yellow ochre nine parts and boracic acid one part "borax."

To Take Gold from the Surface of Silver

☞ Spread over it a paste composed of powdered sal ammoniac with aqua fortis, then heat it until the paste smokes and is nearly dry, when the gold may be separated by rubbing it with a scratch brush.

To Grind Glass

☞ A fine mat surface on glass may be produced by grinding the surface on a wooden wheel set with wet silver sand.

Process of Gilding

☞ Place in a plate leaf gold, add a little honey, stir the two substances carefully together with a glass stopper, the lower end of which is to be very flat. Throw the resulting paste in a glass of water, mixed with a little alcohol, wash and leave it to settle; decant the liquid and again wash the deposit. Repeat the operation until the result is a fine, pure and brilliant powder of gold. This powder mixed with common salt and powdered cream of tartar, and stirred up in water, serves for gilding. As another method of gilding Boutet Mouvel gives the following directions: Dissolve

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in aqua regia one grain of fine gold, previously rolled out very thin, in a porcelain capsule heated on the sand-bath, and concentrate until it is the color of ox-blood. Add a pint of distilled water, hot, in which have been dissolved four grains of white cyanide of potassium. Stir with a glass rod and filter the liquid through unsized paper. To gild with this liquid it is heated a little above lukewarmness, and the articles to be gilded are immersed in it and supported upon a piece of very clean zinc.

Fluid Glue

☐ A fluid glue is prepared by dissolving in a water bath a certain quantity of glue with the same quantity of strong vinegar, one-fourth alcohol and a little piece of alum. Owing to the vinegar, this glue also retains its fluidity in a cold condition. It is very handy for a number of small jobs for which an adhesive agent of great power is not necessary, since it is always ready for use and lasts for an indefinite time. Manufacturers of imitation pearls use it in large quantities; it is also useful for gluing mother-of-pearl, horn, etc., to wood or metal.

Colorless Cement

☐ A fine and absolutely colorless cement can be obtained by cutting seventy-five grammes of rubber into very small pieces, and putting them in a bottle containing sixty grammes of chloroform, which should then be hermetically corked. When the rubber is completely dissolved, fifteen grammes of mastic in drops should be added, and the bottle again corked tight. The cement will be ready for use in eight days.

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To Take Spots Off Gilding

☐ Boil common alum in soft, pure water, and immerse the article in the solution, or rub the spot with it, and dry in sawdust.

To Clean Gilt Ware

☐ In cleaning gilt ware there is a difference to be observed between articles gilt by fire or by the galvanic process and articles gilt with imitation gold. For cleaning articles gilt by the first two methods, 1 part of borax dissolved in 16 parts of water may be employed. With this solution the article is to be carefully rubbed by means of a soft sponge or brush, then rinsed with water and finally dried with a linen rag. If convenient, the article should be warmed previously to being rubbed to insure its brilliancy.

Cleaning Electroplate Silver

☐ The gas and multitudinous other emanations of a city will unconditionally tarnish all kinds of silver plate. The tarnish on electroplate goods may be removed by immersing the article from one to ten or fifteen minutes, or until the tarnish has been removed, but no longer, in the following solution: Rainwater, 2 gallons; potassium cyanide, $\frac{1}{2}$ pound; dissolved and put into a stone jug or jar and closely corked. After immersion, the articles must be taken out and thoroughly rinsed in two or three waters, then dried with a soft linen cloth, or if frosted or chased work, with fine, clean sawdust. Tarnished jewelry may be speedily restored by this process; but make sure work of removing the alkali, as it will corrode the goods.

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To Harden Case Springs

☐ In order to harden case and other pressure springs it is well to first heat them, then rub them over with soap, heat them to a cherry red (not a white heat, because the steel would burn), dip them quickly in petroleum, anneal light blue, in place of oil rub them over with tallow, let it smoke off and cool on the annealing sheet. The tempering and smoking off is best performed outside the workshop, since a bad smell is created thereby.

Care of Watchmakers' Brushes

☐ The only good way to clean a brush is with soap and water—warm water, if convenient, being preferable. Wet two brushes, soap them and then rub them together in plenty of water, and the job is done. The only objection to this way is the delay by drying; but this need not be, for six brushes assorted will give you three clean ones to use while the other three are drying; and the workman who cannot afford half a dozen had best seek some more lucrative occupation. More damage to the appearance of the movement is done by injudicious brushing than by any other means. The watch may not be injured in its quality as a time-piece, but it grows prematurely old in looks by such severe treatment.

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We Print Herewith a Copy of a Letter from a Satisfied Customer

PARIS, TEX., FEB. 21, 1907

Rogers, Thurman & Co.,
Chicago, Ill.

Gentlemen :

I am sending you a watch by this same mail; please fit a new pallet stone and return it to me so I can deliver it next Thursday.

You will find 60c in the box with the watch to pay for the job. You need not make any other repairs, I will do them myself. I opened my repair shop last week and have more work than I can attend to. All of the goods on the last order have arrived but the foot-wheel. You are so prompt in filling orders that I cannot understand why it has not come. Please let me hear from you about it. I want to express my thanks to you and Mr. Chas. F. Elmore for your kind help in teaching me the trade and starting me in business. I commenced last Fall and have made enough money to buy all of my tools and will send you that order for jewelry and watches next month if my trade keeps up, but I will have to wait until I can get my two show-cases. Write me about the foot-wheel by return mail.

Yours for business,

John T. Erickson

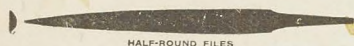
NOTE: The Foot-wheel mentioned in the letter was shipped by freight to save carrying charges. He received it the day after his letter was written.

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\$4.35 LESSON NO. 4 OUTFIT \$4.35



HALF-ROUND FILES



No. 3208 File Handle. Maple \$0.05



No. 4420 Rubber Pin Vise \$0.50
No. 4421 " " " nickel plated..... .65



PLAIN BLOW-PIPE



NEEDLE FILES



No. 4701 Swiss Saw Frame, ...\$0.50



No. 4924 Two-hole Hand Tongs..... \$0.40



FLAT FILES



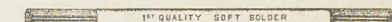
THREE-CORNERED FILE



No. 134 Crown Dial Enamel, Each \$0.20



No. 0000 Solderine is a very fine grade of easy flowing soft solder that can be used without soldering fluid. This is just what you are looking for. Price per bunch of 12 sticks. \$5.25



1st QUALITY SOFT SOLDER per bunch \$0.08 per doz. bunches. 0.80



No. 5300 Cement \$0.20



No. 2323 Chalk Bottle \$0.30



No. 63 Soldering Fluid \$0.20



No. 4511 CLOCK SCREW DRIVER..... \$0.25

¶ We will sell any of the articles in this outfit separately at the prices quoted. Lesson No. 4 Outfit contains all of the tools and material necessary for following the instructions in this lesson, providing you have the tools called for in lessons No. 1, 2, and 3. The Outfit is composed of the following articles:

\$4.35 CONTENTS \$4.35

1 No. 3012 Half Round File.....	\$0.20	½ doz. No. 3010 Needle Files ..	\$0.50
1 No. 3000 Flat File.....	.25	1 No. 4701 Saw Frames and Saws	.50
3 No. 3208 File Handle.....	.15	1 No. 4924 Hand Tongs.....	.40
1 No. 3025 Three cor. File.....	.20	1 No. 5300 Cement	.20
1 No. 4420 Pin Vise.....	.50	1 No. 2323 Chalk Bottle.....	.30
1 Set of 25 Watch Checks.....	.55	1 No. 63 Soldering Fluid.....	.20
1 No. 134 Dial Enamel.....	.20	1 No. 4511 Screw Driver	.25
1 No. 6000 Solderine.....	.25		
1 No. 2007 Blow Pipe.....	.15		
1 Bunch Soft Solder.....	.05		
			\$4.85
		Special 10% Discount....	.50

\$4.35

¶ Send us \$4.35 and we will send you this outfit by express or send us a deposit of \$1.50 and we will ship by express C.O.D. allowing you the privilege of examining the goods before paying the charges. The deposit you send us will be credited on your bill. If you purchase our outfits as we have them listed you will receive the benefit of the extra 10% discount from our regular wholesale prices